application to the structure of Fig. 4 as formed in accord with the given description, the relationship M_{F2}/M_{F1} =1, the optimization the dimensional ranges of layer F1 remain approximately the same as in the first embodiment, while the thickness of the F2 layer, which is a layer of CoFe, is between approximately 10 angstroms and 20 angstroms with 15 angstroms being preferred. All other layers, methods and dimensions would be the same as those of Fig. 3.

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PLEASE AMEND THE FIGURES AS FOLLOWS:

Figures 3 and 4 are amended and attached.

PLEASE AMEND THE CLAIMS AS FOLLOWS:

Please amend claim 1 as follows:

1. A synthetic, patterned, longitudinally exchange biased GMR sensor with narrow effective trackwidth and reduced side reading comprising:

a substrate;

a first layer of antiferromagnetic material formed on the substrate, said layer being a pinning layer;

a synthetic antiferromagnetic pinned layer formed on said antiferromagnetic pinning layer;

a non-magnetic spacer layer formed on said pinned layer;

a ferromagnetic free layer formed on said non-magnetic spacer layer, said free layer having a free layer thickness and a free layer magnetic moment M_{F1};

a non-magnetic antiferromagnetically coupling layer formed on said ferromagnetic free layer;

a patterned, longitudinal biasing layer formed on said coupling layer, said biasing layer being formed in three segments: two discrete, disconnected and laterally separated ferromagnetic segments and a central portion between and continuous with said segments that has been rendered non-magnetic by an oxidation process, and wherein said ferromagnetic segments are laterally and symmetrically disposed to either side of the antiferromagnetically coupling layer and wherein the separation of said segments defines a physical trackwidth and wherein said biasing layer has a biasing layer thickness, a biasing layer magnetic moment M2 and wherein there is a synthetic coupling energy J_s between said biasing layer and said free layer and wherein said longitudinal biasing layer is antiferromagnetically coupled to said free layer through said antiferromagnetically coupling layer;

a second antiferromagnetic layer formed on said patterned, longitudinal biasing layer and coexstensive with it, said second antiferromagnetic layer being exchange coupled to said longitudinal biasing layer and there being an exchange energy, J_{ex}, between said second antiferromagnetic layer and said biasing layer;

a conductive lead layer formed on said antiferromagnetic layer; and

wherein said free layer thickness and said biasing layer thickness are determined so that the magnetic moment of said free layer, M_{F1}, and the magnetic moment of said biasing layer, M_{F2}, satisfy the relationship $M_{F2}/ M_{F1} =(J_s + J_{ex})/ J_s$.

Please amend claim 22 as follows:

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22. A synthetic, patterned, longitudinally exchange biased GMR sensor with narrow effective trackwidth and reduced side reading comprising:

a substrate;

a first layer of antiferromagnetic material formed on the substrate, said layer being a pinning layer;

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a synthetic antiferromagnetic pinned layer formed on said antiferromagnetic pinning layer;

a non-magnetic spacer layer formed on said pinned layer;

a ferromagnetic free layer formed on said non-magnetic spacer layer, said free layer having a free layer thickness and a free layer magnetic moment M_{F1};

a non-magnetic antiferromagnetically coupling layer formed on said ferromagnetic free layer;

a patterned, longitudinal biasing layer formed on said coupling layer, said biasing layer being formed in three segments: two discrete, disconnected and laterally separated ferromagnetic segments and a central portion between and continuous with said segments that has been rendered non-magnetic by an oxidation process, and wherein said ferromagnetic segments are laterally and symmetrically disposed to either side of the